

WHAT IS CLAIMED IS:

1. An active matrix organic electro luminescence display panel device,
comprising:
 - a substrate;
 - at least one low refractive thin film formed on the substrate; and
 - an organic electro luminescence diode formed on the low refractive thin film to selectively emit light.
2. The device according to claim 1, wherein a refractive rate (n) of the low refractive thin film is less than or equal to 1.5.
3. The device according to claim 2, wherein the low refractive thin film includes at least one of silica aerogel and silica gel.
4. The device according to claim 1, further comprising:
 - a switching device formed on the low refractive thin film for selectively driving the organic electro luminescence diode; and
 - a capacitor for sustaining a light emission of the organic electro luminescence diode.

5. The device according to claim 4, wherein the organic electro luminescence diode includes:

- a first electrode formed of transparent conductive material on the low refractive thin film and connected to the switching device;
- an organic light emission layer including an organic luminous material on the first electrode; and
- a second electrode including a metal material to cover the organic light emission layer, the switching device, and the capacitor.

6. The device according to claim 5, wherein the switching device includes:

- a buffer layer formed on the substrate;
- a semiconductor layer formed at a predetermined area on the buffer layer;
- a gate insulating film and a gate electrode sequentially deposited on the semiconductor layer;
- a drain electrode connected to the semiconductor layer and connected to the first electrode of the organic electro luminescence diode; and
- a source electrode connected to the semiconductor layer and connected to the capacitor.

7. The device according to claim 6, wherein the capacitor includes:
a capacitor electrode formed on the buffer layer and separated from the semiconductor layer with a gap therebetween;
a first insulating layer covering the capacitor electrode; and
a power electrode overlapping the capacitor electrode on the first insulating layer and connected to the source electrode.

8. The device according to claim 6, further comprising:
a second insulating layer covering the switching device and the capacitor, wherein the second insulating layer includes a contact hole and a portion of the first electrode is within the contact hole; and
a third insulating layer formed between the second insulating layer and the second electrode.

9. The device according to claim 5, further comprising at least one fourth insulating layer formed between the low refractive thin film and the first electrode.

10. The device according to claim 1, further comprising:
a switching device formed between the substrate and the low refractive thin film;
and

a capacitor formed between the substrate and the low refractive thin film to sustain a light emission of the organic electro luminescence diode.

11. The device according to claim 10, wherein the organic electro luminescence diode includes:

a first electrode formed of transparent conductive material on the low refractive thin film, wherein the low refractive thin film includes a contact hole and a portion of the first electrode is within the contact hole contacting the switching device;

an organic light emission layer formed of organic luminous material on the first electrode; and

a second electrode formed of metal material to cover the organic light emission layer, the switching device and the capacitor.

12. The device according to claim 11, wherein the switching device includes:

a buffer layer formed on the substrate;

a semiconductor layer formed at a predetermined area on the buffer layer;

a gate insulating film and a gate electrode sequentially deposited on the semiconductor layer;

a drain electrode connected to the semiconductor layer and connected to the first electrode of the organic electro luminescence diode; and

a source electrode connected to the semiconductor layer and connected to the capacitor.

13. The device according to claim 12, wherein the capacitor includes:
a capacitor electrode formed on the buffer layer and separated from the semiconductor layer with a gap therebetween;
a first insulating layer covering the capacitor electrode; and
a power electrode overlapping the capacitor electrode on the first insulating layer and connected to the source electrode.

14. The device according to claim 12, further comprising a second insulating layer formed between the substrate and the low refractive thin film to cover the switching device and the capacitor.

15. A method of fabricating an active matrix organic electro luminescence display panel device, comprising the steps of:
forming at least one low refractive thin film on a substrate; and
forming an organic electro luminescence diode on the low refractive thin film to selectively emit light.

16. The method according to claim 15, further comprising the step of:

forming a switching device and a capacitor on the low refractive thin film, wherein the switching device is provided for driving the organic electro luminescence diode and the capacitor is provided for sustaining the light emission of the organic electro luminescence diode.

17. The method according to claim 15, wherein a refractive rate (n) of the low refractive thin film is less than or equal to 1.5.

18. The method according to claim 15, wherein the low refractive thin film includes at least one of silica aerogel and silica gel.

19. The method according to claim 16, wherein the step of forming the organic electro luminescence diode includes:

forming a first electrode of transparent conductive material on the low refractive thin film connected with the switching device;

forming an organic light emission layer of organic luminous material on the first electrode; and

forming a second electrode of metal material to cover the organic light emission layer, the switching device, and the capacitor.

20. The method according to claim 19, wherein the step of forming the switching device includes:

- forming a buffer layer on the substrate;
- forming a semiconductor layer at a predetermined area on the buffer layer;
- forming a gate insulating film and a gate electrode sequentially on the semiconductor layer;
- forming a drain electrode connected to the semiconductor layer and connected to the first electrode of the organic electro luminescence diode; and
- forming a source electrode connected to the semiconductor layer and connected to the capacitor at the same time when forming the drain electrode.

21. The method according to claim 20, wherein the step of forming the capacitor includes:

- forming a capacitor electrode on the buffer layer to be separated from the semiconductor layer with a gap therebetween;
- forming a first insulating layer to cover the capacitor electrode; and
- forming a power electrode overlapping the capacitor electrode on the first insulating layer and connected to the source electrode.

22. The method according to claim 19, further comprising the steps of:
forming a second insulating layer to cover the switching device and the capacitor,
wherein the second insulating layer includes a contact hole and a portion of the first
electrode is within the contact hole; and
forming a third insulating layer formed between the second insulating layer and
the second electrode.

23. The method according to claim 19, further comprising the step of forming
at least one fourth insulating layer formed between the low refractive thin film and the first
electrode.

24. The method according to claim 15, further comprising the step of:
forming a switching device between the substrate and the low refractive thin film;
and
forming a capacitor between the substrate and the low refractive thin film for
sustaining the light emission of the organic electro luminescence diode.

25. The method according to claim 24, wherein the step of forming the
organic electro luminescence diode includes:

forming a first electrode of transparent conductive material on the low refractive thin film, wherein the low refractive thin film includes a contact hole and a portion of the first electrode is within the contact hole contacting the switching device;

forming an organic light emission layer of organic luminous material on the first electrode; and

forming a second electrode of metal material to cover the organic light emission layer, the switching device and the capacitor.

26. The method according to claim 25, wherein the step of forming the switching device includes:

forming a buffer layer on the substrate;

forming a semiconductor layer at a predetermined area on the buffer layer;

forming a gate insulating film and a gate electrode sequentially on the semiconductor layer;

forming a drain electrode connected to the semiconductor layer and connected to the first electrode of the organic electro luminescence diode; and

forming a source electrode connected to the semiconductor layer and connected to the capacitor at the same time when forming the drain electrode.

27. The method according to claim 26, wherein the step of forming the capacitor includes:

forming a capacitor electrode on the buffer layer to be separated from the semiconductor layer with a specific gap therebetween;

forming a first insulating layer to cover the capacitor electrode; and

forming a power electrode to overlap the capacitor electrode on the first insulating layer and connected to the source electrode.

28. The method according to claim 26, further comprising the step of forming a second insulating layer between the substrate and the low refractive thin film to cover the switching device and the capacitor.